METHOD OF PROVIDING CONTINUOUS FEEDBACK

BACKGROUND OF THE INVENTION

The present invention relates generally to printing systems and more particularly to a method and system for communicating network printer status changes.

Printing systems, and in particular network printers, offer a myriad of features in addition to plain printing. Some of these features include scheduling, printing, private print, fax, and other types of document handling features. Because of these extra features, there are more status changes in the print job's lifecycle than with standard printing, such as Printing, Processing, Paused, Deleting, etc. Since all jobs are submitted to the printing system through a standard print driver, there is a need to communicate job progress through the standard print driver, in addition to any special client software provided by the printer manufacturer. Furthermore, because these states are more dynamic than normal printing, for example fax progress such as dialing, connecting, transmitting, etc., there is a need to communicate job progress in a continuous manner, practically in real time.

Thus, there is a need for a component in the frontline of the printing system that is capable of monitoring the printing system by monitoring event progress and communicating the job progress status to the printing clients connected to the printing system, wherein the clients are connected to the printing system through various protocols.

BRIEF SUMMARY OF THE INVENTION

In view of the aforementioned needs, the invention contemplates a component that is an add-on to a spooler and exploits the spooler's connectivity to the networking layers to receive print jobs. The component monitors the printing system by listening to status change messages and pushes the status changes to the clients as plain text that is localized to the client's language. While the preferred embodiment illustrates a component that is an add-on to

a spooler, as those skilled in the art can readily appreciate the component may also be a part of the spooler.

One aspect of the present invention is a feedback component. The feedback component comprising means adapted for the component to register with the spooler's application programming interface. Once registered, the component can receive a status message from a spooler, receive a signal from an image output system, whereupon the image output system communicatively coupled to the spooler. The component determines a native language for a network client and sends a job state message to the network client. The job state is at least one of the group consisting of a status message and a signal from the printing system. The component translates the job state message to a format compatible with the network client, such as plain text.

Another aspect of the present invention is that it is customizable so that a network client may only receive a selected type of job status messages.

Still yet another aspect of the present invention is that the component may be adapted to delay sending the job status message for a first time period. If no other job status messages are received at the expiration of the first time period, the job status message is sent to the network client. However, if before the expiration of the first time period a second job status is received, the component waits until the end of a second predetermined time period before sending a status update, and normally sends only the most recent update. This is to avoid sending too many status messages in a short time period which may be irritating to the network client and would also prevent the printing system for bogging down networks with a high volume of network traffic.

Another aspect of the present invention is a method for providing continuous feedback from a printing system, comprising the steps of monitoring the printing system, receiving a status update, converting the status update to a format compatible with a network client; and sending the status update to the client. The component would ordinarily register with the

printing system. The converting step may convert the status update to plain text, or to a foreign language compatible with the network client.

The method may further comprise waiting a first predetermined time period before sending the status update, and if another status update is received prior to the first predetermined time period, waiting a second predetermined time before sending a status update. The status update may comprise only the most recent status update, a plurality of status updates, or all of the status updates in a single message.

The method may also further comprise selecting a type of status update to be sent to the network client, wherein only messages of the selected type are sent to the network client. Thus the component would filter which status update messages are actually sent to the client. If method also includes the aforementioned time delay feature, only the selected status update messages are considered.

The present invention may be embodied in software, hardware or a combination thereof.

Still other objects of the present invention will become readily apparent to those skilled in this art from the following description wherein there is shown and described a preferred embodiment of this invention, simply by way of illustration of one of the best modes best suited for to carry out the invention. As it will be realized, the invention is capable of other different embodiments and its several details are capable of modifications in various obvious aspects all without from the invention. Accordingly, the drawing and descriptions will be regarded as illustrative in nature and not as restrictive.

BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWING

The accompanying drawings incorporated in and forming a part of the specification, illustrates several aspects of the present invention, and together with the description serve to explain the principles of the invention. In the drawings:

FIG 1 is a block diagram showing the interconnections between the component and the printing system;

FIG 2 is a block diagram illustrating a method of a preferred embodiment of the present invention;

FIG 3 is a time line diagram illustrating the relationship between a first predetermined time period and a second predetermined time period; and

FIG 4 is a block diagram of a method of the preferred embodiment of the present invention for delaying the sending of status updates.

DETAILED DESCRIPTION OF INVENTION

Throughout this description, the preferred embodiment and examples shown should be considered as exemplars, rather than limitations, of the present invention.

The present invention is directed to a feedback component which adds on to a spooler and utilizes the spooler's connectivity with the network clients for communications. The network clients connect to the feedback component through the spooler's application programming interface (API) by making a request to register for feedback. Once the request is received, the feedback component continuously provides the network components with status of jobs in readable text and codes as the jobs progress in the underlying printing system. These status messages are not limited to just print status messages like printing, paused, printed, etc., but may include customized status messages for any device in the printing system such as scheduled, dialing, sending-fax, etc.

In addition, the feedback component registers itself with the printing system by making a request. This causes the printing system to provide signals to the feedback component indicative of activity in the printing system.

On receipt of a signal from the printing system, the feedback component engages in a dialog with the print system to determine the job state. The feedback component then translates the job state to human understandable message in the client's native language and then sends the message to a network component to be displayed by the client. The process occurs in real time.

Another aspect of the present invention is the ability of the feedback component to delay the response by a predefined time, for example T1. This is to avoid sending too many feedback events to close together, especially in the event of heavy activity in the system.

Referring now to FIG 1, there is a block diagram illustrating the various interconnections of the feedback component 10 which is added on to spooler 2 and uses the spooler's connectivity 5 with the network clients 1 for communication.

In addition, the feedback component 10 registers itself with the printing system 3 by making a request as shown by arrow 6. This causes the printing system 3 to send signals indicating job states as shown by arrow 7 to the feedback component 10. Upon receipt of signals as shown by 7, the feedback 10 component may engage in a bidirectional dialog as shown by 8 with the printing system 3. The feedback component 10 then translates the signals 7 into a human understandable language such as text or a language such as a foreign language native to the network client 1. When a network client 1 desires to receive feedback, it sends a request to register for feedback via its connectivity to the spooler's API as shown by arrow 4. From then on the spooler sends feedback messages to the client via the spooler as indicated by arrow 5.

Referring now to FIG 2 with continued reference to FIG 1, there is shown a method 200 for providing continuous feedback as contemplated by a preferred embodiment of the present invention. The method 200 begins at step 202 with a feedback component 10 connecting to a spooler 2. The feedback component 10 may be a separate module from the spooler 2 or may be a feature added on to the spooler 2. At step 204 a request to register for feedback is sent from a network client 1 via the spooler's 10 API (not shown). The feedback component 10 then registers with the printing system 3.

At step 208 the feedback component 10 is monitoring the printing system 3 until a status update is received. At step 210 the feedback component determines if the status update is in plain text in the language of the client. If the status update is in plain text in client's language, then as shown in step 214 the status update is sent to the network client 1. If the status update is not in plain text or not in client's language, then as shown in step 212 the status update message is converted to plain text in client's language by the feedback component 10 and then sent to the network client at step 214. The feedback component 10 returns to monitoring the printing system 3 at step 208.

Another aspect of the present invention is the ability of the feedback component 10 to

delay sending the response by a predefined time slice. This is illustrated by T1 on the time line of FIG 3. Assuming that a status update e_0 is received at the 0 of the time line, if no other status messages are received at time T1, then the status message received at 0 will be sent to the network client 1. However, if another status update e_1 is received before time T1, then the system does not send a message at T1, but instead waits to see if there is more rapid activity till another predetermined time T2 and then sends the latest message received at or before time T2. For example if another message e_2 is received after T1, then message e_2 is sent at time T2. Typically, the message sent at T2 would be the latest status update, however, it is also contemplated that the system may send all of the messages received from 0 to T2 in one batch.

For example, if only event e0 is received before time T1, then at time T1 event e_0 is sent to the network client 1. However, if event e_1 is received before T1 and is the only event received after e_0, then event e_1 will be sent to the network client 1 at T2. Finally, if events e_0 and e_1 are received before T1 and event e_2 is received before T2 then event e_2 is sent to the network client. This prevents the excessive network traffic when many events are occurring continuously, but yet insures the network client 1 does receive timely updates (at least one update every T2 time period).

Referring now to FIG 4 with continued reference to FIG 1 and FIG 3, there is shown a method 400 illustrating the time delay aspect of the invention. At step 402 the feedback component receives a signal indicating a status change from the printing system 3. At step 404 the feedback component 10 waits or delays until time T1. At step 406 the feedback component determines whether another status change has occurred. If at step 406 another status change has occurred, then as shown at step 408 the feedback component 10 delays until T2 whereupon at step 410 the feedback component 10 sends the most recent status update to the network client 1 where it is displayed in plain text or in the native language of the network client 1. If at step 406 it is determined that no other status change message has been sent by

the printing system 3, then the feedback component 10 sends the status message to the network client 1 for display.

Another aspect of the present invention is that the feedback component 10 is customizable. The network client 1 may communicate to the feedback component 10 which status updates it desires to receive. All other status messages would then be filtered out by the feedback component 10.

The foregoing description of a preferred embodiment of the invention has been presented for purposes of illustration and description. It is not intended to be exhaustive or to limit the invention to the precise form disclosed. Obvious modifications or variations are possible in light of the above teachings. The embodiment was chosen and described to provide the best illustration of the principles of the invention and its practical application to thereby enable one of the ordinary skill in the art to utilize the invention in various embodiments and with various modifications as are suited to the particular use contemplated. All such modifications and variations are within the scope of the invention as determined by the appended claims when interpreted in accordance to the breadth to which they are fairly, legally and equitably entitled.